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THE UNIVERSITY OF ALBERTA

IDENTIFYING AND CLASSIFYING THE NONVERBAL
BEHAVIOR OF PRESCHOOL CHILDREN
ENGAGED IN PLAY

BY



JOAN LOUISE MACDONALD

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Identifying and Classifying the Nonverbal Behavior of Preschool Children Engaged in Play" submitted by Joan Louise MacDonald in partial fulfillment of the requirements for the degree of Master of Education.

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ABSTRACT

This study of play was primarily concerned with examining patterns of nonverbal behavior of children during three kinds of play: solitary, parallel and social play. Twenty nonverbal behaviors were developed and the children's behavior was categorized along four dimensions within each category: tension, duration, speed and range. Twenty-three children ranging in age from two to six years were video taped for six one hour sessions after a week long orientation period. The data were coded and subjected to chi square tests.

A number of questions were explored: 1) What is the nature of nonverbal behavior across three play styles; solitary, parallel and social? 2) What is the nature of duration, tension, speed and range of action in each of the three play styles? 3) Is play more off-task or on-task oriented?

Similarities and differences of nonverbal behavior across three play styles were found to exist. Some nonverbal behaviors were found to be more in evidence than others and common to all play styles, while other nonverbal behaviors were found to be more in evidence in a particular play style.

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CHAPTER I

INTRODUCTION TO THE TOPIC

What do we have in mind when we think of play? What do children do when they play? Children's play has the quality of intense, absorbing experience, a bit of life lived richly and fully. There is zest and wonder and drama and a special kind of immediacy that is without thought for the passing of time. There is nothing to be accomplished, no sense of what is right or wrong to check the flow of spontaneity, no direction to follow. Whatever is at hand can become the suitable materials for play. The essence of the play experience is subjective, something within the child that may not necessarily become obvious to the one who observes the course or the form of his activity.

(Biber, 1971, p. 99)

'Play,' said Lawrence Frank, 'is the way a child learns what no one can teach him.' More than ever before, we need to deepen our understanding of the power of this spontaneous, absorbed activity. We need to see what enormous and necessary contributions play and creative activities can make toward the learning and thinking abilities of children--toward the desired cognitive growth that is currently being emphasized almost to the exclusion of all other facets of development.

(Hartly, 1971, p. 80)

Thus we plead the case for more research on play.

Difficult and elusive to define and categorize, the many faceted activity called play has been studied from many diverse viewpoints: cognitive (Piaget, 1951; El'Konin, 1971; Galejs, 1973; Wolfgang, 1974; Lowe, 1975; Hutt, 1976); affec-

tive (Altman, 1971; Strain and Wiegerink, 1976; Eriksøn, 1976); fantasy and role playing (Durrell and Weisberg, 1973; Saltz and Johnson, 1974; Singer and Singer, 1974); language development (Smilansky, 1968; Lovinger, 1974) and environmental effects (Smilarsky, 1968; Busse et al., 1970; Collard, 1971; Hoffmann, 1976).

Surprisingly, most of this research has not examined play within a social context and has failed to define, categorize and quantify the nature of social play. Notable exceptions include studies by Parten (1932), Iwanaga (1973) and Garvey (1974).

Purpose of the Study

In general, this study was designed to develop an outline of nonverbal behavior exhibited by children of preschool age while engaged in free play.

While many studies were focused on play or nonverbal behavior of young children, the literature was lacking in data combining these two areas. It was hoped that by recording children's nonverbal behavior and their play styles, a pattern of nonverbal behavior could be obtained for specific play styles.

Definition of Terms

For the purpose of this study, the terms will be defined as follows:

Nonverbal Behaviors: those actions which convey meaning

through changes in facial expression or body movement.

Play: all actions excluding those of a purely body functional nature which are freely initiated by the child.

Social Play: play in which children interact with their peers. For this study, social play was subdivided into three play styles; solitary, parallel and social.

Solitary Play: activity which is child initiated and has the initiator as the sole participant.

Parallel Play: activity which is child initiated and has each child pursuing his/her own theme but in close proximity with others.

On-task Behavior: behavior in which children are involved in any of the above play styles.

Off-task Behavior: behavior in which children are not involved in play.

Research Questions

Specifically, the purpose of this study was to answer the following research questions:

1. What is the nature of nonverbal behavior during solitary play using on and off-task behavior and dimensions of nonverbal behaviors as descriptors?
2. What is the nature of nonverbal behavior during

parallel play using on and off-task behavior and dimensions of nonverbal behaviors as descriptors?

3. What is the nature of nonverbal behavior during social play using on and off-task behavior and dimensions of nonverbal behaviors as descriptors?

Procedures

The nonverbal behaviors of preschool children from an urban day care centre were recorded on a video tape recorder (VTR) for coding on a checklist. The checklist divided the data between three play styles and twenty nonverbal behaviors. A chi square was used to analyze the frequencies and identify the relationships between play styles and nonverbal behaviors.

Limitations of the Study

While reading the study, it is important to bear in mind the following limiting factors:

1. The intrusion of the VTR in the playroom might have affected the children's behavior.
2. The data collected for each play style were not of equal quantity and caution must be taken when comparing the number of instances of a behavior for each play style.
3. The nature of the study does not enable a trans-

fer of generalizations to other children and settings without replication.

Organization of the Chapters

The remaining chapters are organized in the following fashion.

Chapter two is divided into two sections; the first one presents the literature on nonverbal behavior and the second section presents the literature on play.

Chapter three describes the procedures used in conducting the study. A detailed account of the environment, the instrument used and the actual collection of data is reported.

Chapter four deals in some depth with the findings of the study. The research questions are answered first, generally in terms of patterns of nonverbal behavior in each play style and then more specifically in terms of trends in nonverbal behaviors, on and off-task behaviors and patterns of play styles in terms of dimensions of nonverbal behaviors.

Finally, Chapter five presents the implications and significance of this study.

CHAPTER II

NONVERBAL COMMUNICATION AND PLAY:

THE LITERATURE

Introduction

The literature pertinent to this study involves two subject areas: nonverbal communication and play. Both of these areas were very broad and lacking in a strong theoretical base (Galloway, 1971a; Dunning, 1971). In the first section, a description is provided of the categories which have been traditionally used to describe nonverbal behavior. In addition, a subsection is included on nonverbal behaviors used in research with children.

The second section, play, focuses on exploring the definition of play and then narrows down to research studies concerned with identifying and quantifying levels of social play.

Nonverbal Behavior: Viewpoints

Many attempts have been made to define nonverbal behavior. Because of lack of strong theoretical backing (Dunning 1971; Galloway, 1971a) divergent viewpoints have emerged.

Galloway (1971b) has used a description of the phenomena in attempting to give a definition:

Nonverbal communication is behavior that conveys meaning without words. It can be symbolic or nonsymbolic, spontaneous or managed. It can be expressive, transmitting emotion, or it can be informative, transmitting facts. It can be as specific as a gesture or as general as the atmosphere of a room. It can be either dynamic or static.

(p. 37)

Presently, there are four camps of thought on nonverbal behavior.

1. Nonverbal behavior is a kind of language and therefore it is important to try to discover its components and structure. Much like linguists, researchers who hold this point of view (Birdwhistell, 1970; Ekman, Frisen and Tomkins, 1971; Rancourt, 1972 and Blurton-Jones, 1972) have attempted to break down the phenomenon into constituent parts.
2. Nonverbal behavior is governed by cultural conventions which dictate the nonverbal behaviors which are acceptable in different situations. This anthropological or sociological viewpoint is supported by Hall (1968) and Mehrabian (1967, 1968).
3. Nonverbal behavior can only be studied under well controlled conditions in artificial situations. Much of the pioneer work was done in laboratory environments (Goodenough, 1931, Ekman, 1965).
4. Nonverbal behavior is best studied using a well controlled experiment but in a naturalistic setting using

the following methods:

- . field experiments on unsuspecting subjects. In this research, a confederate is used. He may or may not be blind to the purpose of the study.
- . lab experiments which copy real-life situations. In this research, subjects are asked to take part in an experiment. They are requested to be active in a discussion or interview where they meet real people and real feelings may be aroused. A confederate may be used such as in the classic design of the "waiting room" or two genuine subjects may meet and be asked to participate in some familiar social behavior (Ekman and Friesen, 1967; Mehrabian, 1967; and Mehrabian and Ksionzky, 1972).
- . role-played laboratory experiments. Subjects are shown a video tape recording and asked to relate the emotional state of those viewed on film (Kumin and Lazar, 1974).

Nonverbal Behavior - Categories

Originating from one or a combination of some of the above viewpoints, researchers were able to identify and attempt to quantify ten main nonverbal behaviors (Argyle, 1969).

Body Contact

This includes a wide variety of forms, examples of which would be hitting, stroking, patting etc. There appears to be a large cultural difference in who may touch whom and

where and when the touching may occur. In most cultures, body contact is far more common inside the family between the familial members than outside the family (Joward, 1966; Anderson, 1973).

Proximity

This refers to the closeness with which a person will position himself to another individual. Again, there are cultural differences. The Latin Americans stand in relatively close proximity while the British maintain a reserved distance (Hall, 1968). However, the differences in distance are not great, involving only a matter of two to three inches and researchers Porter, Argyle and Salter (1970) found that as an indicator of information about individuals it was almost useless.

Orientation

This refers to the angle at which people sit or stand in relation to each other. There are cultural variations (Watson and Graves, 1966) for interpreting orientation. A 90 degree orientation is most common in England and the United States (Sommer, 1965; Mehrabian, 1967; and Cook, 1970).

Appearance

The main purpose for manipulating appearance tends to be to send a message to others about ourselves. Messages are sent regarding social status, economic standing etc.

Posture

This may be used to convey interpersonal attitudes

(Mehrabian, 1968). Posture can convey an emotional state (Ekman and Friesen, 1967, 1974). Posture is less well controlled than facial expression or tone of voice and some researchers (Ekman, 1969) feel that it is a very reliable indicator of emotion.

Head Nods

This is usually used in connection with speech acting as a reinforcer. If A nods at B, B's behavior tends to increase. It is also used as an indicator of permission.

Facial Expression

This is a highly specialized communication area which appears to be culturally universal and mainly independent of learning (Ekman, 1969). However, because it is so highly developed, true emotional expression may be masked through learning. There are some elements of facial expression such as expansion or contraction of pupils and perspiration during anxiety which cannot be masked (Haggard and Isaacs, 1966). Facial expressions are used in close partnership with speech (Vine, 1971; Ekman et al., 1971; Buck et al., 1972, and Abramovich and Marvin, 1975).

Gestures

These are movements of the head and hand which are often closely coordinated with speech. Some gestures indicate a general emotional state while others are more indicative of particular emotional states. Baxter et al., (1968), Kuman and Lazar (1974) and Meacham and Nicolai (1975) have contri-

buted to this area.

Looking

This plays an important role in communicating interpersonal attitudes and establishing relationships (Argle, 1973). Looking is closely connected with verbal communication. It is used to obtain information and feedback (Ash-ea and Snortum, 1971).

Nonverbal Aspects of Speech

Elred and Price (1958), Davitz and Davitz (1959) and Davitz (1964) have explored the effects of pitch, stress and timing in speech.

Summary

A lack of a clear theoretical background has resulted in nonverbal behavior research to be splintered into four viewpoints and methods of research:

1. the study of its component parts and structure;
2. the study of behavior as a cultural phenomenon;
3. the study of behavior in artificial and controlled conditions;
4. the study of behavior with a controlled design but in a naturalistic setting.

The following categories were defined and measured using the above mentioned methods:

- | | |
|-----------------|---------------|
| 1. body contact | 2. proximity |
| 3. orientation | 4. appearance |
| 5. posture | 6. head nods |

7. facial expression
8. gestures
9. looking
10. nonverbal aspects of speech

Nonverbal Behavior - Children

Most of the previously mentioned studies used adult subjects. Different research techniques and categories have been developed and employed for children's nonverbal behaviors.

Blurton-Jones (1972), in his brief overview of early research, begins with a cautionary note. He points out basic weaknesses in design. Firstly, there was no clear evidence that the halo effect was avoided. Secondly, the inter-observer agreement and the validity of scales used was in question.

In addition, much data were collected through mother interviews. There were problems with leading and embarrassing questions and mothers withholding information, either willingly or unwillingly. Keeping these shortcomings in mind, Blurton-Jones presented an overview of the literature.

Little documentation was available on the nonverbal behaviors of the one year old (Blurton-Jones, 1972).

Data have been gathered on children from ages two to five. For convenience, the data will be divided into broad categories of behavior.

Gestures

This is the same category as adult behavior. Connolly

and Smith (1972) and Leach (1972) studied mother-child relations involving the transfer of an object from the child to the mother. Pointing behavior was often studied in young children.

Crying

This fits loosely into the adult category of nonverbal aspects of speech. Landreth (1941) was able to draw these conclusions about three to five year olds. Falls and quarrels were the most common situations to elicit crying. Boys cried more than girls both at home and at school.

Laughing

The literature suggested that laughing only occurred in the presence of other children. Blurton-Jones (1967) has executed extensive research in this area.

Smiling

This is a refined version of the adult facial expression category. Leach (1972) and Blurton-Jones and Leach (1972) have studied the smile in the child's interaction with the mother. Brannigan and Humpries (1976) have defined three common smiles; simple, upper and broad.

Aggressive Interactions

This suggestive category could have included all the adult categories but "head nods". A wide range of scales has been used by researchers to measure this behavior (Grant 1968; Blurton-Jones, 1972).

Summary

Blurton-Jones has identified weaknesses in the pioneer research and advised a cautionary attitude toward this research when used as a baseline for further study. The data in nonverbal communication in children was divided into the following categories:

1. gestures
2. crying
3. laughing
4. smiling
5. aggressive interactions

Much of the research stemmed from the first viewpoint, that is, study of the structure and its component parts (Blurton-Jones, 1967, 1972, 1976; Brannigan and Humpries, 1976; and Leach, 1972).

The categories traditionally used in nonverbal research with young children were not suitable for this study because they could not provide a full enough description of children's behavior while engaged in free play. The adult categories offered more of a range than the child categories but they would have required extensive adaptation if used for this study.

Model for Thesis

Clearly a more detailed and well defined design had to be devised in order to obtain a broad, yet descriptive account of children's nonverbal behavior while engaged in play.

Descriptive studies in nonverbal communication often employed the use of audio or video tape recorders to obtain

data. The tapes were usually analyzed through the use of checklists, of which numerous forms exist.

The most recent and comprehensive checklist was the product of a large research team at Maryland University under the direction of Jessie Roderick. This tool is the result of analysis of child observations on video tapes and diary notes, careful literature searches and countless hours of research validation. Not only were nonverbal behaviors identified but accompanying dimensions for each behavior were specified.

The main focus of Roderick's 1973 study was on children's involvement in play using nonverbal behaviors as descriptors. The terms 'on-task' and 'off-task' were used to determine the involvement of the child in play. For instance, if a child was looking at the play material with which (s)he was playing, the vision behavior would be considered on-task. If the child were playing with a puzzle and looking at someone who entered the room, the vision behavior would be off-task.

The project involved eight graduate students collecting fifteen minute observations of each of forty-four preschool children in order to define student involvement in a task. The children were observed through a one way screen and all nonverbal behaviors were recorded in a diary fashion. Eight steps were taken to develop a checklist and analyze the results:

1. observation of individuals in the classroom, focusing on their nonverbal behavior;

2. recording in diary fashion the observed behavior;
3. analyzing and categorizing of data;
4. development of an observable system;
5. development of data collection sheets;
6. collection of data;
7. analysis of data;
8. revision

The first seven steps were completed by 1971. The revision occurred the following year. Teams of two, observed three, four and five year olds in classrooms with VTR's focusing on one behavior only. Firstly, they had to more clearly define the behavior. This was accomplished by reviewing related literature and participating in numerous discussion meetings. The new definitions were therefore based on literature, discussions and observations of children. The final action taken in the revision was a content analysis check.

Thus, the resultant checklist of behavior and dimensions resembled the following:

Behaviors

1. motion - movement of the body as a whole and/or parts of the body not included in categories of stance, visual, nonvisual facial and self-sounds. Body movements (self) of the body or parts of the body from one point (place) to another and object movement and/or handling of an object (Roderick, p. 51).
2. stance - body position such as sitting, kneeling, standing, squatting, lying down, leaning. Implied in this is a posture which includes the whole body or most of it in a position that lasts for more than a fleeting moment (Roderick, p. 52).

3. visual - attention of the eyes as demonstrated by eye movement or eye position. Also includes head movement associated with eye position (Roderick, p. 54).
4. nonvisual facial - actions involving the total face or parts thereof not defined as visual. e.g. movement of tongue, nose (Roderick, p. 55).
5. self-sounds - sounds made in conjunction with object movement or made as a vocalized expression, e.g. hum, laugh siren noise (Roderick, p. 55).

Dimensions

1. range - width of the movement. Measured in narrow, average, broad continuum (Roderick, p. 68).
2. speed - indication of the rapidity of a movement or action. Measured in fast (less than a second), medium and slow (more than two seconds) continuum (Roderick, p. 66).
3. tension - indication of power, intensity or physical display of emphasis in producing an action. Measured in weak, average and strong (Roderick, p. 62).
4. frequency - amount of repetition in the number of times an action occurs (Roderick, p. 60).
5. duration - an indication of the length of time an action occurs. Measured on a short (one second), average (several seconds) and long (minutes) scale (Roderick, p. 63).
6. specific-global - is a continuum defined by its end-points. A specific behavior relates to a particular part of the body. A global behavior involves the body as a whole (Roderick, p. 11).
7. direction - is the focus of attention or movement (Roderick, p. 11).

8. frequency of change - the number of types of behavior within an observation (Roderick, p. 11).

A later study (Roderick, 1973) produced a further breakdown of behavior (to be described in detail in Chapter III). Not all dimensions were felt to be useful in the present study. Range, speed, tension and duration were felt to be the most important and relevant. The other dimensions were deleted.

Summary

A descriptive study by Roderick (1971, 1973) was used to provide the basic data gathering technique and the basis for a checklist in order to code the data for analysis.

What is Play?

It is not easy to define play. Ours is not a civilization that has paid much attention either to play or to other expressive forms.

(Sutton-Smith, 1970, p. 1)

Conceding the point that play is difficult to define, the approach taken by Garvey (1978) in identifying play not by definition but rather by characteristics has been adopted.

Play has been quoted as being a physical activity (Garvey, 1978). Yet play can be a mental activity which involves musing or daydreaming (Biber, 1971). Play is role playing. Through play roles, children can express pressing needs, act out problems and aggression (Erikson, 1976), develop values (Riley, 1973) or merely imitate adults.

Play is exploratory in nature (Hutt, 1971; Hartly, 1973).

Through the manipulation of materials and language, concepts are discovered. Play is spontaneous (Almy, 1971), self-initiated, self-directed, creative and participatory. Primarily a process rather than a product, play is developmental in nature. Piaget (1951) and El'Konin (1971) viewed play as a developmental process from the sensory to the symbolic.

Play contributes to all facets of learning; social, cognitive, physical and emotional. This study was only concerned with the social aspect of play.

Play Defined by Research

Parten

One of the earliest research studies which attempted to clarify play was conducted by Mildren Parten (1933). Thirty-four children were observed daily for one minute of free play until sixty or more behavior samples were obtained in order to assess the degree of participation in the following six categories:

1. Unoccupied - not involved in an activity.
2. Solitary - playing by oneself.
3. Onlooker - positioned on the fringe of a play activity to observe the activity.
4. Parallel - playing in close proximity to another child but not sharing a play theme.
5. Associative - sharing the same materials and in close proximity but not sharing the same play theme.

6. Organized supplementary - sharing materials in close proximity and jointly developing the play theme.

Also, the degree of leadership under five headings (following, independent pursuit, following some and directing others, sharing leaderships with another and directing alone) was measured.

The most important findings of the study were:

1. The size of play groups increased with age.
2. The most social play style was found in the house-keeping area.
3. Parallel play was often found in connection with sand play and constructive activities with clay, paper, beads and paint.
4. Although younger and older children played with the same materials, their manner with the materials was different in terms of social play. (Parten, 1933)

Perhaps the most stimulating outcome was that a successful attempt was made to categorize and measure play, fostering a better understanding of the nature of play.

When Barnes (1971) conducted a replication of Parten's study he found that three and four year olds

displayed significantly more unoccupied, solitary and onlooker activity and significantly less associative and cooperative play than Parten.

(Rubin et al., 1976, p. 414)

Barnes suggested that caution be used when employing Parten's data as a norm for social play.

Garvey

Through the observation of dyads in a controlled environment, Garvey's study of social play was an attempt to distinguish between four possible categories of social behavior.

The categories were:

1. Social non-play - both children were engaged in an activity which was judged not to be play oriented.
Example: both may cooperate to fix a broken toy.
2. Nonsocial nonplay - one or both independently explored an object.
3. Non-social play - one or both independently engaged in an imaginary activity.
4. Social play - both were mutually engaged in cooperating to share and develop a play theme.

(Garvey, 1963)

This study was of utmost importance in that an attempt was made not only to categorize social play but to also look closely at the nature of play and to examine the skills needed to perform this activity.

Iwanaga

An attempt was made by Iwanaga to categorize children's play with reference to the structure children used when interacting with peers during play. Four structures were defined:

1. Independent structure - child initiated and engaged in a play activity which included only himself as

a player.

2. Parallel structure - child initiated and engaged in a play activity where independent roles were assigned to him/her and another.
3. Complementary - roles were independent of each other while the children played together. Some cooperation was present.
4. Integrative - roles were integrative upon each other while playing together.

Observations of thirty subjects revealed the following findings:

1. The four play structures existed and could be distinguished.
2. The play structures were progressive bearing a strong relationship to chronological age with the highest occurrence of parallel play in three year olds, complementary play in four year olds and integrative play in five year olds.

Support for Iwanaga's findings can be found in Sharpe (1972), Clune (1973), Galejs (1973) and Grief (1973).

Discussion and Summary on Research

Common trends merge from the previous three studies of social play. There appeared to be a developmental stage where children played alone. They did not require the physical presence of other children while engaged in this play style. Parten labelled it solitary play, Garvey termed it nonsocial play and Iwanaga called it independent play. It

was usually the first play style in which young children were engaged. Yet, it would be dangerous to consider it a low level of play (Strom, 1976). Rather than rate it on a scale, it would be better to say that this play style has a different function than the other social play styles. Often the child's need to explore a material or concept on his own is met by this play style. A child often indulged in solitary play while possessing the skills for other play styles.

The next identifiable stage is characterized by children pursuing their own play theme independently but in close proximity with others. Parten and Iwanaga called it parallel play. Garvey did not have a category for this behavior. This play style appeared to be the initial bridge from solitary to interactive play. It was most often seen in young children, aged three to four (Parten, 1933, Barnes, 1976).

From this point on, the categories of social play were difficult to distinguish. They all showed the characteristic of the participants sharing a theme to some degree. There was evidence of social interaction between the players. Parten identified two separate categories in this play style; associative and organized supplementary play. Garvey simply lumped these into one category; social play. Iwanaga divided this play style into two levels; complementary and integrative play.

Definitions for the Study

For the purpose of this study, three play styles were deemed appropriate. The first play style was solitary play.

The definition was inspired by Iwanaga (1973). Solitary play is child initiated and includes the play activities of the child in which (s)he is the only player. From the literature, this play style appeared as a distinct phenomenon with its own characteristics. It was felt that the nonverbal behavior observed in a noninteractive play style could act as a baseline for comparison with the two other interactive play styles.

The second play style to be considered was parallel play. That is, child initiated play in which each child pursues his/her own theme but in the close proximity of others. It was felt that this play style was the bridge from a noninteractive to an interactive play style. It was thought important to investigate the nonverbal behaviors in this play style in order to search for clues which showed a link to interactive play.

Rather than have a multitude of degrees of interactive play, it was felt that all play which showed a sharing and developing of a play theme through interaction of players would be grouped together and called social play. It was felt that the nonverbal behaviors of this play style would be markedly different from the other two play styles. It was speculated that the behaviors in this play style would be more person than materials oriented.

Using these three categories of play, this study attempted to record the distribution of nonverbal behavior

across the three play styles. It also attempted to record on and off-task behavior in each play style. The nature of nonverbal behavior in each play style was to be recorded and analyzed.

CHAPTER III

RESEARCH PROCEDURES

Introduction

In order to answer the questions presented in Chapter I, the research design had to fulfill a number of requirements:

1. A means of collecting young children's play behavior had to be devised in as unobtrusive a manner as possible. A natural play setting was the most desirable environment.
2. An instrument to code the nonverbal behavior had to be devised in order to accurately record the behaviors on paper.
3. Consideration had to be given to the characteristics of the children used in the study.
4. A routine for data gathering and coding had to be devised.
5. Provision had to be made for inter-rater reliability.
6. An appropriate test for showing relationships between play style and nonverbal behavior had to be chosen. The nonparametric data suggested the use of chi square.

Decisions Concerning Design

Means of Collecting Nonverbal Behavior

In order to record as full an account of children's play behavior as possible, the video tape recorder (VTR) was employed. This decision was based on the data collection practices of Rancourt (1972), and Abramovich and Marvin (1975). This enabled the data to be frozen on tape allowing for coding at a later date. Recording the children's utterances as well as their visual nonverbal behavior was necessary for determining play style. Also, a richer understanding for the children's actions would be provided by retaining the audio track of the tape. For example, a verbal taunt might be followed by a punch or a change in stance away from the child who uttered the verbal stimulus. There was speculation that the VTR would initially cause some disruption in the natural play pattern of children. The intrusion of the VTR might result in behaviors ranging from withdrawal to exhibitionism. For this reason, a week of orientation was conducted in which the researcher collected data for one hour a day in the children's environment while they were involved in free play. The data collected were discarded. After the week of orientation, the children were able to regard the VTR as an integral part of their environment and were involved with their established play patterns.

Development of a Coding Instrument

A descriptive instrument was devised that would yield

a detailed account of the nonverbal behaviors the children exhibited when involved in free play. Using the checklists devised by Roderick (1972a, 1972b, 1973) and synthesizing them into one manageable tool, the author was able to code behavior. The checklist consisted of a number of nonverbal behaviors and each was modified by four dimensions. Theoretically, this gave a total of eighty variables. However, as will later be shown in this chapter, the actual total number of variables was sixty-two.

There were six nonverbal behaviors (motion, vision, pause, stance, facial and self-sounds) with several subdivisions (Appendix A). Each behavior was modified by four dimensions; tension, duration, speed and range (Appendix B).

Some of the dimensions would not be appropriate for all the behaviors and an additional point was added to the scale, absence. The nonverbal behaviors were modified with the dimensions in the following manner:

1. motion - tension, duration, speed, range.
2. pause - tension, duration. Because a pause was the cessation of motion, both speed and range could not be measured.
3. vision - tension, duration. More sophisticated equipment like the instruments used in perceptual studies in psychology would have to be used to measure changes in range and speed of eye movement. Because the use of this equipment would be incompat-

ible with the basic philosophy of data collection in this study, that is, being as unobtrusive as possible, a decision was made to delete these two dimensions with vision.

4. stance - tension, duration, speed, range.
5. facial - tension, duration, speed. Since all the facial changes would involve small muscular movements, the dimension range would not be useful in determining differences in behavior. It was, therefore, deleted.
6. self-sounds - tension, duration, range. Speed was deleted from this behavioral category as it was inappropriate to measure the speed of a laugh or scream.

Thus, the checklist offered a total of sixty-two non-verbal variables to be linked with three play styles.

Pilot Study

In order to test the feasibility of using a VTR in a classroom, a pilot study was conducted. A total of twenty-three children in the afternoon class of an urban kindergarten were used in the study. Five afternoons of the first week were used as an orientation period. The following week of data collection revealed that a larger play centre was needed and that a centre with a play based curriculum was desirable so that all levels of social play would be in evidence. The pilot study did show that it was possible to record children's behavior during free play and the need for an orientation period.

Characteristics of Children Used in the Study

The children used in the study were attending an urban day care centre. Ranging in age from two and one half to six years of age, the children came from a wide range of socioeconomic backgrounds. All twenty-three children spent the entire day at the centre, some arriving as early as 8.00 a.m. and leaving as late as 5.30 p.m. Samples of behavior used in the study were drawn from all the children. The day care centre was selected because of the space available and long play period.

The intention of the study was not to focus on individual children but rather on the collection of nonverbal behaviors across three play styles.

Characteristics of the Environment

The centre consisted mainly of two large classrooms and a large courtyard. The data were collected from only one of the classrooms (Appendix C). This was a large carpeted area on two levels, the lower level being used as the block or construction area. This area was stocked with a variety of wooden blocks and planks. The upper level was divided into many play centres; the housekeeping area, painting, quiet corner with wooden bench and three-sided bookcase, the craft area, the small manipulative area including a wide range of puzzles and games, the water and sand areas in close proximity and the carpentry area.

Procedures for Gathering Data

The VTR was placed near the quiet corner (see Appendix C) commanding a good overview of the entire area. There was enough room for the VTR to be moved about freely enabling closer views of children at different centres. The recordings of data were taken from 1.30 to 2.30 p.m. every day, Monday to Friday for two and one half weeks. This was the period that followed the afternoon nap. The first six sessions were used for orientation only. The data from these sessions were not used in the study. The remaining six sessions yielded six hours of free play.

Procedures for Coding Data

Each of the six tapes was dubbed with a beep every thirty seconds. This was easily accomplished as the sound system on the tape had two tracks; one for the children's utterances, the other for the dubbed beeps. Because six solid hours of data was too bulky, thirty second steps would give a manageable means of recording data and at the same time preserving the length and variety of the samples of behavior.

In order to code the data, the researcher proceeded in the following manner:

1. The VTR was still-framed at each thirty second beep.
2. The researcher focused on one of the children in the frame and recorded his/her identification number. If there were more than one child in the frame

each child's behavior was coded separately.

3. The frame number on the VTR was recorded. Unfortunately, when a different VTR machine was used, the frame number did not match with the appropriate thirty second beeps. This caused problems with inter-rater reliability.
5. The type of nonverbal behavior exhibited was determined and recorded as well as dimensions. Duration was achieved by replaying and timing the action sequence. Often, more than two behaviors were recorded for each instance, one of which was always in the vision category.

Inter-rater reliability

The first third of the data collected was subjected to random inter-rater reliability. A rater was trained with the researcher in order to establish reliability in coding.

Using the same VTR machine as was used for the original coding, the researcher and the second rater randomly selected instances of behavior exhibited on the thirty second beep, coded the behavior according to play style and nonverbal descriptors and then compared the resulting coding with the original coding. This gave both inter and intra rater reliability. Approximately twenty-five percent of the data were recorded in this manner. The following reliability was

achieved:

play style - 96%

categories of nonverbal behavior - 94%

dimensions - tension - 91%

- speed - 95%

- range - 85%

Inter-rater reliability checks were not needed for speed as this was simply a mechanical timing of the action from its initiation to its cessation..

Unfortunately, the researcher was not able to obtain the original VTR machine to establish inter-rater reliability with the remaining data. This caused a serious limitation of the study. But in view of the high percent of compatibility for the first third of the data, the researcher felt fairly confident that the checklist could be used with some degree of reliability in coding data.

Analysis of Data

The data collected are nonparametric in nature and therefore a chi square was advisable in order to determine a relationship between play styles and nonverbal behavior. The resultant cross tabulations revealed percentages for each play style with each nonverbal dimension. Raw frequencies would also be obtained. Hopefully, patterns within each play style would emerge when compared across the nonverbal behaviors.

Summary

A VTR was used as the means of collecting data for this study. The VTR recorded children's behavior during free play in a natural setting. A checklist was devised to identify three play styles; solitary, parallel and social. Nonverbal behaviors were also to be identified. These included the general headings of motion, pause, vision, stance,

facial and self-sounds. These behaviors were further modified by a four point scale on which tension, duration, speed and range were rated. A pilot study indicated that it was possible to record children's behavior during free play, that an orientation period was necessary and that a large environment was needed in order to allow for flexibility in the movement of the VTR. After a six day orientation period, the data were collected. The six hours of data were dubbed with beeps every thirty seconds in order to allow for systematic coding. The data were coded using the devised checklist. Inter-rater reliability was established on the first two hours of data collected. A chi square was used on the nonparametric data in order to establish relationships between play styles and nonverbal behaviors.

CHAPTER IV

ANALYSIS AND RESULTS

The primary purpose of this study was to examine the relationship between play styles and nonverbal behavior. Cross tabulations of the data across play types rendered descriptions of nonverbal behavior. In addition, chi square tests of significance were used to assist in answering the research questions.

Because the data were collected randomly, unequal amounts of instances for each of the three play styles (solitary, parallel and social play) were collected. Great caution must be therefore exercised when comparing play styles with each other in reference to nonverbal behavior. The study sought to establish whether nonverbal behaviors were in evidence in each play style and whether play styles could be described using nonverbal behaviors. Further research which gathered equal amounts of data for each play style would be required in order to make valid comparisons between each play style using nonverbal behaviors.

Solitary Play

Research Question #1: What is the nature of nonverbal behavior during solitary play using on and off-task

behavior and dimensions of nonverbal behavior as descriptors.

Results:

Based on raw scores, solitary play had the least number of occurrences recorded. Data for solitary play were absent from the following categories:

- MAP - motion unrelated to task with person(s)
- MAM - motion unrelated to task with materials
- MAB - motion unrelated to task with both materials and person(s)
- VB - eyes focused on task, vision directed toward materials and person(s)

Appendix D shows the percentage of occurrences of nonverbal behaviors in solitary play. The nonverbal behavior frequencies were converted to percentages using as the total, the sum of the frequencies across all three play styles.

A portion of Appendix D is reproduced below to provide a brief overview of the nonverbal behaviors in solitary play.

Discussion:

The highest percentage occurrence of behavior in solitary play was VM (eyes focused on task, vision directed toward materials). Sixty-seven point nine percent of all instances were over seven seconds in duration. This would indicate that children engaged in solitary play have their eyes focused on the materials with which they were playing and

Overview of Solitary Play

Behavior	Frequency	Percentage	Rank Order
MTM	92	23.5	2
S	86	22.3	3
VM	78	32.8	1
MTB	7	5.6	12
VB	0	0	0
VP	1	1.5	12
MA	7	13.0	8
VAP	9	18.8	6
F	10	21.3	5
M	10	22.2	4
P	2	5.4	13
V	2	7.1	10
MTP	3	13.6	7
MT	1	5.6	12
VAM	2	11.1	9
VAB	1	5.9	11
MAP	0	0	0
SS	1	6.3	10
MAM	0	0	0
MAB	0	0	0

(table 1)

they were intent on the activity for fairly long periods of time. The materials with which children were involved were puzzles, paints, fine motor construction sets (Lego) and funnels, bottles and containers found in water and sand play.

The nonverbal behaviors in which twenty to thirty percent of behaviors were found in solitary play revealed a preoccupation with materials. The most frequent motion recorded in solitary play was MTM (motion related to task with materials). In each of the four dimensions (tension, duration, speed, range) for MTM, there was a significant difference across the three play styles ($\chi^2 = 28.66599$ to 11.71058 ; $p < .05$). Refer to Appendices G-J. In the majority of instances, the body stress was average or appropriate to the task (table 2).

MTM - Solitary Play

Dimension	Weak 1	Medium 2	Strong 3
tension	12.0%	71.7%	16.3%
duration	70.7%	14.1%	15.2%
speed	27.2%	57.6%	15.2%
range	44.6%	38.0%	17.4%

(table 2)

Most MTM behaviors were of short duration (table 2), only one or two seconds in length. One would expect this

when considering that most of these tasks involved small manipulative actions such as activity with puzzles and small piece construction.

Characteristically, the speed of MTM fell mostly in the medium category with some tallies in the weak cell. Most of the actions were deliberate and unhurried in nature rather than spontaneous or careless.

Many of the movements were small using fine muscles (table 2). Many were appropriate to the task and only a few required the use of large muscles. This data was compatible with the tension data in suggesting a picture of mainly small manipulative movements.

In summary, most of the MTM behaviors employed medium body stress, were of short duration characterized by medium speed and involved the use of fine motor muscles.

The high occurrence of tallies for stance behavior indicated the high mobility of children while engaged in play. Simple postural changes from sitting to standing, from kneeling to squatting were characteristics of stance change in solitary play. For the dimensions of tension and duration, there was a significant difference across the three play styles ($\chi^2 = 21.91451, 25.22292, p < .05$).

Although the majority of behaviors occurred in the medium body stress cell, there were a number of occurrences within the other categories as well (table 3). Apparently, children change position within a wide range of body tensions.

Stance - Solitary Play *

Dimension	Weak 1	Medium 2	Strong 3
tension	29.1%	47.7%	23.3%
duration	32.6%	47.7%	19.8%

(table 3)

Almost half the changes in stance occupied three to six seconds of time. Roughly a third of the postural changes were of short duration, only occupying one to two seconds of time (table 3).

The chi square test did not establish a relationship between the behavior motion, across the three play styles. Therefore, no discussion is warranted.

The behaviors in which only ten to twenty percent of occurrence was found in solitary play showed results which merit an explanation. The relatively high percentage occurrence of MTP [motion related to task with person(s)] would appear to be incompatible with the basic definition of solitary play, this is, play which is exclusive of other individuals. The actual raw score is only three instances. These instances possessed an element of aggression or possessiveness. There were instances of the observed child pushing or motioning another child away from himself or the play materials. These aggressive actions were ensuring the ownership of materials or securing a position in the play

environment. A decision had to be made as to whether these actions would best be described as MTP or MAP [motion unrelated to the task with person(s)]. A decision was reached to retain these actions within MTP since the motion was related to the play theme in that it ensured the safety of the materials for further play.

The relatively high occurrence of MA (motion unrelated to task or activity) can be explained quite simply. This behavior was often a secondary motion. Many of these motions were self-stimulating in nature such as rocking, thumb sucking or leg swinging. These behaviors did not hinder the play behavior but they were also not a part of it.

Most MA behaviors were of short duration lasting up to two seconds (table 4).

MA - Solitary Play

Dimension	Weak 1	Medium 2	Strong 3
duration	71.4%	28.6%	0.0%
range	85.7%	0.0%	14.3%

(table 4)

The majority of those motions required small muscle use and were close to the body (table 4).

No relationship was established between facial movement and the three play styles. Nor were there any relationships established between VAM (eyes not focused on task,

vision directed toward materials) and VAP [eyes not focused on task, vision directed toward person(s)] with the play styles. ⤴

The number of actual instances for the behaviors with under ten percent of occurrence in solitary play were so small (only one or two) that they do not merit an in-depth explanation. Suffice to say that these behaviors (V, SS, VAB, MT, MTB, P, VP) were not often found in solitary play.

It was interesting to note that there were not many data for self-sounds during solitary play. The observed children appeared to be silent, concentrating on the task at hand. There was also not much evidence of pausing during solitary play. Children decided on a task and completed it without concern for the surrounding activities.

Four of the five behaviors for which no data were collected for solitary play were behaviors unrelated to the task. This would support the notion that children engaged in solitary play direct their actions toward the development of that play (Strom, 1976).

One would expect children engaged in solitary play not to exhibit actions unrelated to the task with either materials, persons or both as they have often chosen this mode of play either to develop a skill or explore and experience a concept on their own. Also noteworthy is the finding that children do not visually seek out others around them who are not directly involved in their own solitary play.

Summary:

The following findings for solitary play can be stated:

1. Solitary play was mostly coupled with materials both in motion and vision.
2. The behavior in solitary play was mostly on-task in motion and vision.
3. Solitary play was characterized by a large amount of change in stance.
4. Little data was collected for self-sounds, pause and behaviors involved with persons and materials and persons.
5. Solitary play was characterized by behavior of widely varying duration. For motion related behaviors, two behaviors were prominent in the short duration cell, two were prominent in the medium cell and one was dominant in the long duration cell. The vision related behavior was outstanding in the long duration cell.
6. Solitary play was characterized by the widest range of tension. Most related behaviors were of medium tension. The vision related behavior was found to be predominantly of strong tension.
7. Solitary play was characterized by a wide distribution throughout the three point scale.
8. Solitary play was characterized mostly by small muscle activity. The range was therefore close to the body.

Parallel Play

Research Question #2: What is the nature of nonverbal behavior during parallel play using on and off-task behavior and dimensions of nonverbal behavior as descriptors?

Results:

There were more data collected for parallel play than solitary play. However, not all nonverbal behaviors were in evidence when children engaged in parallel play. For the following behaviors, no data were collected.

MAM - motion unrelated to task with materials

MAP - motion unrelated to task with person(s)

VAM - eyes not focused on task, vision directed toward materials

Appendix D shows the percentage occurrence of nonverbal behaviors in parallel play. The nonverbal behavior frequencies were converted to percentages using as the total the sum of the frequencies across all three play styles.

A portion of Appendix D is reproduced below to provide a brief overview of the nonverbal behaviors in parallel play.

Discussion:

Motion, the behavior which was used when an action occurred which did not fit into any other movement category, was the highest occurring percentage in parallel play.

Overview of Parallel Play

Behavior	Frequency	Percentage	Rank Order
MTM	102	26.1	7
S	96	24.9	8
VM	78	32.8	6
MTB	11	8.8	14
VB	9	7.8	15
VP	8	11.8	12
MA	10	18.5	10
VAP	19	39.6	2
F	8	17.0	11
M	19	42.4	1
P	14	37.8	3
V	10	35.7	5
MTP	1	4.5	16
MT	2	11.1	13
VAM	0	0	0
VAB	2	11.8	12
MAP	6	37.5	4
SS	4	25.0	9
MAM	0	0	0
MAB	0	0	0

(table 5)

Often, these motions were comfort motions such as shifting a leg or wiggling in a chair to ensure a more comfortable position. This was not to be confused with stance where the whole body changes a postural position. The chi square did not establish a relationship between motion and play styles.

Unfortunately, the behaviors in which thirty to forty percent of occurrence happened in parallel play did not reveal a clear pattern of behavior. Vision was divided between on and off-task behavior with either persons or materials. Motion had a high percentage representation in off-task behavior. Perhaps the most striking finding was the relatively high percentage of pause behavior. This high percentage indicated an awareness of the child to his/her surrounding activities and a willingness to investigate these activities. During the pauses, the eyes were often focused on materials or people in close proximity or individuals who were passing through the immediate play environment. This behavior was clearly missing in solitary play. One could suggest that this awareness in parallel play signifies a bridge from solitary play to social play (Kaspar, and Lowenstein, 1971).

The majority of pause behaviors were of short duration, no more than two seconds in length. This strongly suggested a need on the part of the children to monitor surrounding activities before resuming one's own play activities. Burton-

White (1972) suggests that this was a competency based activity.

Pause - Parallel Play

Dimension	Weak 1	Medium 2	Strong 3
duration	78.6%	0.0%	21.4%

(table 6)

Another behavior with a relatively high percentage in parallel play was MAP [motion unrelated to task with person(s)]. Unlike solitary play where there was a preoccupation with materials, there was an emerging trend for the child engaged in parallel play to seek out other people, even if they were not directly involved in the child's play. There was an even distribution throughout the three cells within the dimension speed (table 7). This indicated that there was no clear pattern of speed with which the children performed a motion with a person who was unrelated to the task at hand.

MAP - Parallel Play

Dimension	Weak 1	Medium 2	Strong 3
speed	33.3%	33.3%	33.3%

(table 7)

The chi square value did not establish a relationship with VAP (eyes not focused on task, vision directed toward

person(s)] and V (vision) with parallel play. VM (eyes focused on task, vision directed toward materials) had a relatively high raw score and percentage (Appendix D). This was a pattern to be found in all three play styles. In parallel play, even though the children sought the physical presence of others in close proximity, (s)he was still mainly preoccupied with materials. The child used the materials as a play vehicle and spent much time with his/her eyes focused on the material. Like solitary play, the time spent with eyes focused on materials was of long duration; over two thirds spent between three to over ten seconds (table 8).

VM - Parallel Play

Dimension	Weak 1	Medium 2	Strong 3
duration	23.1%	78.5%	38.5%

(table 8)

Data collected for MTM (motion related to task with materials) as illustrated in Appendix D corresponds well with the data collected for VM. This behavior had the highest raw score of all behaviors collected for parallel play. A relationship was established between the dimensions of MTM and all three play styles. A very high percentage of MTM behavior required medium body tension (table 9).

MTM - Parallel Play

Dimension	Weak 1	Medium 2	Strong 3
tension	2.9%	95.1%	2.0%
duration	59.8%	24.5%	15.7%
speed	22.5%	66.7%	10.8%
range	42.6%	42.6%	14.9%

(table 9)

Over half the behaviors were under two seconds and most were less than seven seconds in duration. Most actions were of medium speed. Some movements were slow in nature. Most actions involved the use of small muscles and were small or medium in range. This indicated motion with materials that would be close to the body. Much of the parallel play occurred at the water, sand, carpentry or puzzle areas. The materials would have dictated the use of small, fine motor movements in most instances.

A sizeable amount of data were collected for stance or postural change in parallel play. This was a pattern found in all three play styles. The majority of stance changes required medium body tension (table 10). This indicated a change in position which did not require much tension or stress on the body.

Stance - Parallel Play

Dimension	Weak 1	Medium 2	Strong 3
tension	20.8%	67.7%	11.5%
duration	36.5%	36.5%	27.0%

(table 10)

The data for the dimension duration indicated that children changed their positions in a wide variety of rates of time (table 10).

There were slightly more data for self-sounds in parallel play than solitary play. Could this be a technique children have developed in order to interest other children around them into sharing their play theme or at least being aware of them? Still, there were not many actual instances recorded. Half the sounds were slow and half were medium in speed (table 11).

SS - Parallel Play

Dimension	Weak 1	Medium 2	Strong 3
speed	50.0%	50.0%	0.0%
range	50.0%	50.0%	0.0%

(table 11)

For self-sounds, the range was interpreted as loudness.

Half the self-sounds were very quiet (like singing or talking softly to oneself) and half were of medium loudness, that is, the strength one would consider normal or appropriate.

The behavior which had ten to twenty percent of occurrence in parallel play included two behaviors which were not task oriented, MA (motion unrelated to task) and VAB [eyes not focused on task, vision directed toward materials and person(s)].

MA referred to self-stimulating motions as discussed earlier in this chapter. The majority of MA behavior was of very short duration, most of which was less than two seconds (table 12).

MA - Parallel Play

Dimension	Weak 1	Medium 2	Strong 3
duration	70.0%	10.0%	20.0%
range	30.0%	50.0%	20.0%

(table 12)

The data for MA - range, showed a wide scope of motions. Half the motions were of medium range and eighty percent of the motions used small motor control and were relatively close to the body. Only twenty percent used large muscles and big movements.

The other off-task behavior in this percentage bracket

was VAB. There were only two instances of this behavior in parallel play.

Any motion which was related to the task but did not include materials or persons was given the label MT. There were two instances of MT in parallel play. These were actions guarding materials or positions in the play environment.

The chi square tests did not establish a relationship with parallel play and F (facial) and VP [eyes focused on task, vision directed toward person(s)].

Those behaviors with under ten percent occurrence in parallel play included three which were task oriented; MTB [motion related to task with both materials and person(s)], MTP [motion related to task with person(s)] and VB [eyes focused on task, vision directed toward materials and person(s)]. All three showed the beginning trend of individuals in close proximity taking a role in parallel play.

Summary:

The following statements can be made about parallel play and nonverbal behavior.

1. Parallel play was usually coupled with materials both in vision and motion behaviors.
2. Mostly, action and vision behaviors were task oriented although there was more data for off-task behavior in parallel play than in solitary play.
3. Parallel play was characterized by a large amount of change in stance.

4. A beginning trend of involvement with both persons and materials simultaneously in parallel play was revealed.
5. A beginning trend of involvement with person(s) exclusive of materials was revealed in parallel play.
6. Parallel play was characterized by very short motion related behaviors and medium duration for the vision related behavior.
7. Parallel play was characterized by the medium tension scale for all motion related behaviors except one which revealed equal occurrence in the second and third cells. The vision related behavior was divided equally between the weak and strong cells.
8. Parallel play was characterized by slow or medium speed in all but one behavior where equal occurrences were recorded in all three play styles.
9. Parallel play was characterized by an even distribution between small and medium movements. The movements were larger in nature than those found in solitary play.

Social Play

Experimental Question #3: What is the nature of non-verbal behavior during social play using on and off-task behavior and dimensions of nonverbal behavior as descriptors?

Results:

Of all play styles, social play had the highest number of recorded occurrences. Of all the play styles, social play was characterized by the greatest number of different nonverbal behaviors. MAB [motion unrelated to task with both materials and person(s)] was the only nonverbal behavior without data in social play.

Appendix D shows the percentage of occurrences of nonverbal behaviors in social play. The nonverbal behavior frequencies were converted to percentages using as the total the sum of the frequencies across all three play styles.

A portion of Appendix D is reproduced below to provide a brief overview of the nonverbal behaviors in social play.

Discussion:

MAM (motion unrelated to task with materials) was found only in social play. There was only one instance indicating that this behavior did not often occur naturally in any play style.

The behavior VB [eyes focused on task, vision directed toward materials and person(s)] had a high occurrence in social play. However, the chi square test did not establish a meaningful relationship with it and social play.

Those behaviors which occurred between eighty to ninety percent in social play revealed a pattern of nonverbal behavior which was related to both materials and persons. Unlike solitary and parallel play, people played a major role

Overview of Social Play

Behavior	Frequency	Percentage	Rank Order
MTM	197	50.4	16
S	204	52.8	15
VM	82	34.5	19
MTB	107	85.6	5
VB	107	92.2	2
VP	59	86.8	4
MA	37	68.5	11
VAP	20	41.7	17
F	29	61.7	9
M	16	35.6	18
P	21	56.8	14
V	16	57.1	13
MTP	18	81.8	8
MT	15	83.3	6
VAM	16	88.9	3
VAB	14	82.4	7
MAP	10	62.5	12
SS	11	68.8	10
MAM	1	100	1
MAB	0	0	0

(table 13)

in this play style. The majority of behaviors were task oriented.

No relationship between play styles and VAM (eyes not focused on task, vision directed toward materials) and social play and VP [eyes focused on task, vision directed toward person(s)] were established.

Both MTB [motion related to task with both materials and person(s)] and MTP [motion related to task with person(s)] were shown to have high percentages. One would expect the MTP percentage to be high because of the nature of social play. The presence of MTB in such prominence indicated that although children may have operated on a representational level (El'Konin, 1971) in play, they still require the use of some props, that is, materials with which to develop their theme.

The majority of body tension was found to be of medium stress for MTB (table 14).

MTB - Social Play

Dimension	Weak 1	Medium 2	Strong 3
tension	3.7%	82.2%	14.0%
speed	7.5%	53.8%	38.7%
range	11.2%	43.9%	44.9%

(table 14)

The data collected for MTB - speed, showed a shift from slow to medium speed in parallel play to medium and fast in social play (table 14). This indicated a faster pace in social play. The distribution of instances for range showed a tendency for movement to be large muscle, involving large sweeping movements (table 14).

Of slightly less percentage than MTB was MTP [motion related to task with person(s)]. Almost all instances of tension for MTP were of medium stress (table 15). Only a very few instances required strong body tension

MTP - Social Play

Dimension	Weak 1	Medium 2	Strong 3
tension	0.0%	94.4%	5.6%
duration	61.1%	38.9%	0.0%

(table 15)

These movements were of fairly short duration, almost two thirds were less than two seconds. The remaining actions were less than seven seconds (table 15).

A high percentage of MT's (motion related to task or activity) were recorded in social play. These behaviors were usually representational in nature (El'Konin, 1971; Vygotsky, 1966) such as washing imaginary dishes or combing hair with an imaginary comb. Because social play was mostly

on a fantasy or imaginary level (Singer and Singer, 1974), it was expected that this behavior would show a high percentage in social play.

Another behavior with a high percentage in social play was VAB [eyes not focused on task, vision directed toward materials and person(s)]. The trend to visually monitor surrounding activity had its roots in parallel play (refer to the preceeding section on parallel play). It is much more in evidence in social play at 82.4%.

There were four behaviors which had between sixty to seventy percent of occurrence in social play, three with which a relationship was established across the play styles; the facial behavior did not. After looking at the raw scores, one could see that social play contained a higher number of facial codings than the other play styles but no conclusions could be safely drawn.

Although not many instances of self-sounds occurred, 68.8% of these occurred in social play. Could this be a simple way of relating the theme from one player to another? Or are the sounds needed to make the fantasy play more realistic? The large majority of self-sounds were slow in nature. For example, a siren sound was long and drawn out into a wail (table 16). Most of the sounds were of medium volume but some were loud. This differs from the quiet sounds characteristic of solitary play and the quiet to medium sounds of parallel play (table 16). It would appear that

social play is noisier in nature than the other two play styles.

SS - Social Play

Dimension	Weak 1	Medium 2	Strong 3
speed	81.8%	18.2%	0.0%
range	0.0%	72.7%	27.3%

(table 16)

A high percentage of MA (motion unrelated to task or activity) behavior was observed in social play. It would appear that children were engaged in a number of self-stimulating activities while engaged in social play; more so than the other play styles. In social play, this behavior also included such motions as running, jumping, hopping etc., that were exclusive of the play theme.

The MA behavior revealed a wide duration span with almost half the behaviors occurring between three to six seconds. The remaining occurrences were split evenly between the short and long categories (table 17). Most of the motions were medium to large in nature (table 17). This was a sharp contrast to 70.0% and 71.4% in the weak category of parallel and solitary play (tables 4 and 12).

MA - Social Play

Dimension	Weak 1	Medium 2	Strong 3
duration	27.0%	45.9%	27.0%
range	10.9%	43.2%	45.9%

(table 17)

Of all instances recorded for MAP [motion unrelated to task with person(s)], 62.5% occurred in social play. The balance of occurrences were in parallel play. This pointed to an increased awareness of persons in close proximity from parallel to social play.

There were slightly more data for pause in social than parallel play. The pauses were usually not more than six seconds in duration with the majority less than two seconds (table 18).

Pause - Social Play

Dimension	Weak 1	Medium 2	Strong 3
duration	66.7%	23.8%	9.5%

(table 18)

As with other play styles, MTM (motion related to task with materials) was very much in evidence. This was to be expected as children needed materials with which to play, whether it be nonrepresentational or representational play.

The large majority of motions were executed with medium body stress (table 19). All play styles established this pattern for MTM.

MTM - Social Play

Dimension	Weak 1	Medium 2	Strong 3
tension	2.5%	89.3%	8.1%
duration	65.5%	27.4%	7.1%
speed	10.2%	63.5%	26.4%
range	22.3%	41.6%	36.0%

(table 19)

Over half the motions were of short duration while some were up to six seconds (table 19). Short duration characterized the other two play styles as well. The majority of movements were of medium speed, with some representation in the other two cells. There was a wide distribution of movement in terms of range. The majority were from medium to large body movements. This differs from the pattern of weak to medium established in the other two play styles.

In summary, MTM behaviors were executed with medium body stress, were of short duration, of moderate speed and ranged from medium to large movements.

VAP [eyes not focused on task, vision directed toward person(s)] had a 41.7% occurrence in social play but did not obtain a $p < .05$.

Of the two behaviors with less than thirty percent occurrence in social play, VM (eyes focused on task, vision directed toward materials) obtained a $p < .05$; M (motion) did not. The behavior VM was the most evenly distributed behavior among all play styles. Children focus visually on materials during play, regardless of play style.

Summary:

The following statements can be made about social play and nonverbal behavior:

1. Social play was most often coupled with materials both in vision and motion behaviors.
2. Most of the action and vision behaviors were on-task although there was more data on off-task behavior in social play than in the other two play styles.
3. It was characterized by a large amount of change in stance.
4. It showed a trend of involvement with persons exclusive of materials in both vision and motion.
5. It was characterized by the widest variety of nonverbal behaviors of all play styles.
6. Social play was exclusively predominant in very short or medium duration for motion related behaviors. The vision related behavior was predominantly medium in duration.

7. The motion related behaviors in social play were characterized by medium tension. The vision related behavior was of weak tension.
8. Social play in all but one behavior where the highest percentage of occurrences was recorded in the slow cells was of medium speed.
9. Social play was characterized by medium to large movements.

Summary

The study revealed two nonverbal behaviors which were of high frequency and common to all three play styles, MTM (motion related to task with materials) and S (stance). One could assume then, that both these behaviors were characteristic of children's play regardless of the play styles.

Solitary and parallel play shared many similar characteristics. The main difference was in behaviors involving persons in which parallel play revealed a trend toward monitoring the surrounding activity. This interest in surrounding activity occurred in solitary play only when a potential threatening intrusion invaded the play space of the solitary player.

Social play revealed a marked differences from the other two play styles in a greater frequency of occurrences, a wider variety of behaviors and a greater involvement with persons into the play theme. The nature of play was markedly

altered when persons rather than materials took a more prominent role in developing the play theme. The need for more interaction and cooperation between children to establish, develop and maintain a play theme in social play dictated the different nonverbal behavior patterns in social play from the other play styles.

The data revealed an increase in proportion of off-task behavior from solitary to parallel to social play. The data also revealed that children were mostly involved with task oriented behavior. This indicated a high degree of intrinsic motivation and involvement. Perhaps this phenomenon could be explained by recalling the trend begun in parallel play of children showing an awareness of their surroundings while in solitary play, they did not show this concern. Social play demands a variety of competencies (White, 1972), one of which was integrating the play activities with the surrounding activities. It was therefore necessary to monitor via off-task activities.

Different patterns of behavior with the dimensions were established for each play style.

Solitary play had the widest variation of data for duration, tension and speed. With regard to range, most of the actions in solitary play required fine muscle coordination. Social play tended toward the middle to upper end of the scale while parallel play tended toward the lower to middle end of the scale.

Children not only exhibited differing patterns of non-verbal behavior while engaged in different play styles but they performed these behaviors in different degrees of tension, duration, speed and range. Each play style should be seen as differing in its function or goal and in its nature. This will be discussed in more detail in Chapter Five.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS

The purpose of this study was to examine the patterns of nonverbal behavior of children during three kinds of play: solitary play, parallel play and social play. Twenty categories of nonverbal behavior were developed and the children's behavior was categorized along four dimensions within each category: tension, duration, speed and range. Twenty-three children ranging in age from two to six years were videotaped for six one hour sessions following a week of orientation. The nonverbal behaviors exhibited by the children were coded from the video tape with the aid of a checklist (Appendix K) at thirty second intervals. Both the play type and the nonverbal behavior were coded. The data were subjected to chi square tests from which relationships were found to exist across the play styles and some nonverbal behavior. Similarities and differences in the nonverbal behaviors exhibited in each play style were described.

Summary of Findings

The summary will be divided into four areas; the first dealing with the general distribution of nonverbal behavior across all three play styles; the second, with on and off-

task behavior; the third, with the nature of the three play styles; and the last with the nature of the dimensions of nonverbal behavior with the three play styles.

Distribution of Nonverbal Behavior

1. The five most frequently occurring behaviors were MTM, S, VM, MTB and VB. Social play accounted for most of the occurrences in MTB and VB.
2. The four behaviors which were most evenly distributed across the play styles were MTM, S, MA and M. Because of the uneven number of behaviors collected for each play style, it is difficult to draw conclusions. However, the high raw frequencies for MTM and S in all three play styles indicated that those two behaviors are the most common activities to be found in children's play.
3. The data for parallel and solitary play were very similar, with slightly more occurrences in parallel play. The behaviors with the highest frequencies were materials related and stance changes.
4. The behaviors which were predominant in social play were persons and materials or persons related. There was also a higher occurrence of off-task and pause behavior in social play. Again, this statement must be made with caution because of the uneven collection of data for each play style.

On and Off-Task Behavior

1. All play styles were characterized by a majority of

on-task behavior.

2. There were little off-task data for solitary play.
3. Parallel play revealed slightly more off-task behavior than solitary play.
4. Social play had the most occurrences of off-task behavior both in frequency and variety.

Nature of the Three Play Styles

1. Solitary play was characterized by motions involving materials.
2. Almost all solitary play was on-task in nature.
3. One of the most predominant behaviors in solitary play was stance change.
4. Little data were collected for self-sounds, pause and behaviors involving persons or persons and materials.
5. Parallel play was characterized by motions involving materials.
6. Most behaviors were task oriented but there was more off-task data for parallel play than solitary play.
7. Parallel play was characterized by a large amount of change in stance.
8. A trend revealing the beginnings of involvement with both persons and materials simultaneously in parallel play was found.
9. A trend revealing the beginnings of involvement with persons exclusive of materials was found in

parallel play.

10. Social play was characterized by motions involving materials.
11. Most behavior was task oriented but there were more off-task data in social play than in any other play style.
12. Social play was characterized by a large amount of change in stance.
13. When compared with parallel play, there were much more data for behavior which involved persons exclusive of materials.
14. When compared with parallel play, there were much more data for behavior which involved both persons and materials.
15. Social play was characterized by the widest variety of nonverbal behaviors of all play styles.

Nature of Nonverbal Dimensions

1. Solitary play was characterized by a wide range in duration.
2. Parallel play was characterized by behaviors of one or two seconds in duration.
3. Social play revealed a trend toward short to medium instances of duration.
4. Solitary play was characterized by a wide range in tension with a slight majority in the medium cell.
5. Both parallel and social play were characterized by medium tension.

6. Solitary play was characterized by a wide distribution of behaviors in speed.
7. Parallel play was characterized by slow and medium speeds.
8. Social play revealed a trend toward medium speed.
9. Solitary play was characterized by small muscle activity.
10. Parallel play was mainly small muscle but had some data in the medium range.
11. Social play was characterized by larger muscle movements than the other play styles.

Conclusions

The following summary is based on the findings reported in chapter four.

1. Generally, children at play were involved in a great deal of movement. Of the categories used in the analysis, those which had the highest frequency were motions related to tasks, materials and persons; as well as stance changes. The high occurrence of visual focus on tasks indicated that generally, children are attentive to their play tasks despite a high frequency of stance changes.
2. Generally, solitary and parallel play were characterized by nonverbal behaviors oriented toward materials, while social play was characterized by nonverbal behavior oriented toward both people and

materials. An almost exclusive orientation of solitary play with materials both in vision and motion may be explained in terms of play function. Apparently, one of the functions of solitary play was to explore materials and test them in differing situations in order to gain mastery of the material and to develop new concepts through manipulation. Parallel play was mostly materials oriented but it appeared to be for a different reason than solitary play. The observations seemed to suggest that parallel play served as a bridge for those children who were developing the skills needed to interact with other children. It was as though the familiar materials served as a base or security for the child. Throughout parallel play, the position of the materials was of utmost importance. In all incidences of parallel play, the materials for each player were in close proximity to each other. Thus, short seconds of interaction with each other was made possible. Although more person oriented than the other two play styles, social play exhibited a high inclusion of materials within the play sequences. The observations revealed the materials as initiators of play themes and were often the focal point of interaction between the players. The high occurrence of stance throughout all three play styles was to be expected as children are active during play.

3. On-task behavior was characteristic of all three play styles with the highest frequency of off-task behavior in social play. Because play is of a self-initiated, spontaneous nature, it was not surprising that most of the behavior for all three play styles was task oriented. The few off-task behaviors coded during solitary play occurred during a general disruption such as a loud noise. Off-task behaviors in parallel and social play were often monitoring behaviors. Generally, children engaged in parallel and social play were able to fulfill their commitment in the play style and concurrently monitor their surrounding activities.
4. Solitary play was the least frequently occurring of all the play styles while social play was the most frequent. Because the data were collected in a natural environment, it would seem that the children were familiar with the materials in their environment and were more interested in interacting with their peers than solely with materials. Schatz and Ellis (1975) explored the possibility of peer preference versus play objects and found that initially, the play objects sustained the children's interest but that upon repeated exposure, the preference fell increasingly toward their peers. As the data were collected in a day care where the majority of the children had been together for at least a year in

the same room, it would be fair to suggest that the children were at a stage where peers were more attractive than materials. Thus, while the children might have had a need to explore some of the materials at some point during the day, most chose to spend most of their time interacting with their peers.

5. More interaction with peers was displayed during parallel play than solitary play. It has been suggested that parallel play serves as a bridge to social play from solitary play.
6. Social play was characterized by the widest variety of nonverbal behaviors of all play styles. Social play has been described as the most complex play styles. Social play has been described as the most complex play style because children were required to develop a number of skills (Garvey, 1974), in order to engage successfully in this activity. A play style of a complex nature would surely be characterized by a wide range of differing behaviors.
7. Solitary play was characterized by the widest range of duration, tension, and speed and small muscle activity. This might be explained by Sutton-Smith's (197) functional definition of play. Solitary play is essentially the vehicle through which children explore and manipulate their surroundings. Consider the different motions involved in solving a jigsaw

puzzle or exploring the properties of water with a plastic funnel and bottle. The task the child sets for himself determines the range of the dimensions of behavior. Also the behavior is entirely in the child's control as there is no need to accommodate to pace, motion or duration of others.

8. Parallel play was characterized by nonverbal behavior of short duration, medium tension, short to medium speed and mainly small motor activities. Most incidents of parallel play were located in the puzzle and craft areas. Some motor movements of medium tension were required for almost all the tasks at these centres. The high occurrence of short duration indicated a break in the play pattern in order to monitor the behavior of another player. Often, this was characterized by a shift in eye focus from materials to the other player or by a body movement toward the other player.
9. Social play was characterized by nonverbal behaviors of short to medium duration, medium tension and speed and larger motor movements than the other play styles. This indicated a play style of a more boisterous nature. That is, when children interacted with each other, larger motions were used, the action was quicker and the play sessions were of a longer duration. During social play, a fantasy theme was almost always in existence. The children assumed

the role of a fantasy character and were required to fulfill the demands of that role which often necessitated leaping, running, jumping and making loud sounds. The super heroes of television were in abundance.

Implications for Education

The data have shown that children are very active while engaged in play. Perhaps educators could make provision for this level of activity in their programs. It would appear that in an unstructured setting children are very physically active which is counter to sitting desk-bound minute after minute. A play based program allows children the freedom to move at will while engaged in learning.

If the observations recorded during this study can be applied to all children, it would seem that the classroom arrangement is of vital importance. All of the parallel play observed in this study was at centres where small manipulative materials were placed in close proximity. It appeared that children who had not yet developed the skills or confidence to interact with their peers often chose those areas in order to make initial nonthreatening contacts with peers. Perhaps teachers could arrange their classrooms to foster parallel play for her/his pupils to develop their play skills.

Perhaps a secondary implication of this study is the need for teacher observations in the classroom. The day care

workers requested the viewing of the films taped for the study in order to observe the behavior of some individuals who were of special concern. The workers felt that while they were active in the classroom they were missing some of the behaviors of these children and only through unbiased observation could they obtain a clear picture of the behaviors in order to diagnose treatment. Teachers could be advised to record observations, so that as teachers they could better understand their pupils' strengths and weaknesses and plan for them.

Research Considerations

The Nature of Parallel Play

The most intriguing play style was parallel play because it was the pivot upon which social play was developed. A more detailed account of this phenomenon is needed to enable us to better identify the skills and procedures children are developing which will lead them into social play. Examining the nonverbal behaviors is only one way of describing this play style. Perhaps studies using diary type observations would produce a fuller picture of this play style.

Defining Social Play

Because of its complexities, the most difficult play style to define is social or interactive play. Each researcher and writer is now required to define his/her own categories of play according to the purpose of the study or argument. More serious thought needs to be directed toward developing

a more universal set of definitions with clearer delineations between the various levels of interaction.

Role of Language

This study did not concern itself with the role of oral language in play, but it was obvious from the observations recorded, that language is of vital importance in developing play skills. Joan Tough's (1974) pioneer work has indicated pathways for more studies to follow. A complete picture of both nonverbal and verbal language in play is very much needed.

Nonverbal Communication

This study did not investigate nonverbal communication but rather nonverbal behavior. Communication involves the sending and receiving of signals or cues. Such a complicated process needs more research which would be of value when employed to describe the play behaviors of young children.

In conclusion, much more research would be needed to provide a clear description of play behaviors. Through additional research a greater knowledge and understanding of children's behavior would be obtained ultimately serving as an information base for classroom teaching and teacher education.

Contribution of Individuals in Biasing Data

It has been suggested that individuals could strongly bias the data so that certain nonverbal behaviors were more in evidence than others. The researcher felt that any group

of children will have a fairly equal sampling of different types of personalities and therefore generalities can be made. However, this is an interesting problem which could be explored through further research.

Problems with Methodology

Focus of the Study

Both play style and nonverbal behavior were major areas of concern for this study. In the initial stage of planning a focus involving one or the other had to be taken. If the major focus was nonverbal behavior, then each behavior would have to be analyzed with the play style as the descriptor, and if play style was the focus, then it would have to be analyzed in terms of nonverbal behaviors. From chapter four the reader is aware that play was the main focus.

Developing a Checklist

The problem of developing a checklist with meaningful nonverbal behaviors was the next area of concern. From the information in Appendix D it was apparent that MAB and MAM were not behaviors typically found in children's play. Perhaps these behaviors could be omitted from further research studies.

The researcher initially felt that by adding four dimensions to each nonverbal behavior, a more concise picture of each behavior would be obtained. The data have not supported this hypothesis. Perhaps a study of this nature where a general descriptor of play using nonverbal behaviors is desired

the dimensions could be omitted.

Collection of Data

Because the collection of data was to be as unobtrusive as possible, the researcher followed the children's actions rather than constructing a setting with more variable controls. This resulted in unequal amounts of data for each play style, no allowance for individual differences and no conclusions for developmental stages of play. A variation on this research design would help to overcome these problems.

Analysis of Data

As the data could not be put in a rank order, a non-parametric measure was used to analyze the data. The unequal amount of data for each play style made comparisons between play styles very risky. Therefore, general statements of each play style using nonverbal behaviors as descriptors were the only valid conclusions obtained.

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APPENDICES

APPENDIX A

DEFINITIONS OF NONVERBAL BEHAVIORS

1. Motion was coded in the following manner:

MT - "motion on task or related to task" (Roderick, 1972a, p. 7)

No materials or other persons are involved. Example: A child involved in fantasy play or role play where (s)he mimes the actions. This also includes any guarding behavior where a child would ensure the possession of materials or position in a play environment through motion which did not involve materials.

MTP - "motion related task with person(s)" (Roderick, 1972a, p. 7).

Example: children running, hopping etc., with one or more persons.

MTM - "motion related to task with materials" (Roderick, 1972a, p. 7).

No motion is directed toward another person. Example: children manipulating puzzles; children adjusting a costume in front of a mirror.

MTB - "motion related to task with both materials and persons: (Roderick, 1972a, p. 7).

Example: A child passing a teacup to another child.

MA - "motion unrelated to task or activity" (Roderick, 1972a, p. 7).

No motion is directed toward person(s) or materials

or it is too difficult to accurately determine the direction of motion. Example: A child swings his/her legs back and forth while engaged in solving a small puzzle. These were mainly self-stimulating motions.

MAP - "motion unrelated to task with person(s)" (Roderick, 1972a, p. 8).

No materials are involved. Example: One child pats another as he passes in close proximity.

MAM - "motion unrelated to task with materials" (Roderick, 1972a, p. 8).

No other person(s) are involved. Example: A child who is painting crouches down to catch a runaway rabbit.

MAB - "motion unrelated to task with material and person(s)" (Roderick, 1972a, p. 8).

Example: A child clutches a possession close to him/her when another child approaches.

M - "motion that cannot be identified as related to previous or emerging tasks" (Roderick, 1972a, p. 8).

These were mainly comforting motions such as shifting a leg or wiggling in a chair to become more comfortable.

2. Pause is the term used to define a person's "temporary cessation of an activity or a condition in which voluntary gross movements of the body stops" (Roderick, 1972a, p. 8).

Example: A child stops the activity in which (s)he is engaged and gazes at another activity.

3. Vision is restricted to eye movement or eye position.

Also included is the accompanying head positioning.

VM - eyes focused on task; vision directed toward materials. No other person(s) are involved. Example: Child has vision directed toward the puzzle pieces (s)he is manipulating.

VP - eyes focused on task; vision directed toward person(s). Eyes are not focused on materials but rather the person(s) involved in play. Example: child watches another as they verbally develop a theme for the play session.

VB - eyes focused on task; vision directed toward materials and person(s). Example: A child watches his/her play mate as (s)he puts another wooden block on a joint construction.

VAP - eyes not focused on task; vision directed toward a person. Eye direction does not appear to include materials. Example: a child glances up at another passing in close proximity.

VAM - eyes not focused on task; vision directed toward materials. Example: A child looks up from his/her task to examine materials newly presented at another centre.

VAB - eyes not focused on task; vision directed toward materials and person(s). Example: Child looks up at children who have created a disturbance by par-

ading around the room.

V - eye attention cannot be judged in the above categories. It is difficult to determine where the eye focus is directed.

4. Stance is "any change in whole body position" (Roderick, 1972a, p. 9). Example: Child moves from a standing to a sitting position.

5. Facial is "any change involving the total face or parts thereof not included in vision" (Roderick, 1972a, p. 9).

Example: smile, frown, grimace.

6. Self-sounds are verbal utterances "made in conjunction with object movement or made as vocalized emotional expression" (Roderick, 1973, p. 48). Example: laugh, scream, sound of a fire engine.

APPENDIX B

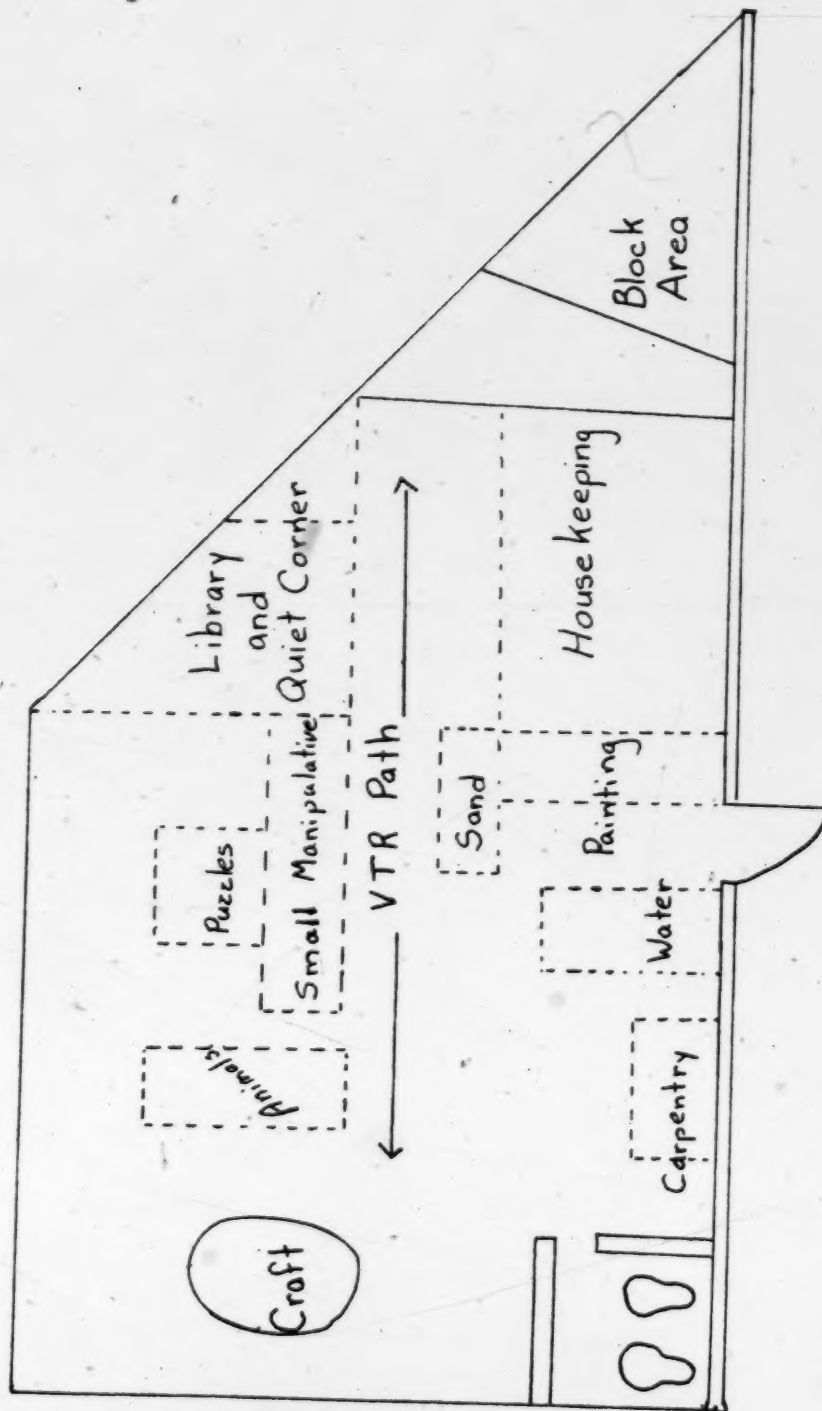
DEFINITIONS OF DIMENSIONS

1. Tension - the amount of stress, strain or intensity in the activity. The first point on the scale was termed weak, i.e. almost no effort involved in the behavior. The second point was termed average, i.e., strain or stress which is deemed appropriate to the task. The third point was termed strong, i.e., much evidence of strain of stress.
2. Duration - the amount of time the action occupied from the initiation of the action to the cessation of the action. The scale was divided thus:
 - a) 1 to 2 seconds
 - b) 3 to 6 seconds
 - c) 7 or more seconds
3. Speed - the indication of the velocity of an action. Again, it was plotted on a three point scale. The first point was termed slow, that is, unhurried, languid action. The second point was termed moderate, that is speed which is average. The third point was termed fast, that is hurried, frenzied or darting action.
4. Range - the width or length of a movement. This dimension was concerned with the proximity of the action of the body or the largeness of the movement. On a three point scale it was defined thus:

1. narrow - small action involving fine muscles
2. average - moderate action
3. broad - large action involving large muscles

APPENDIX C

FLOOR PLAN OF PLAY AREA



8'

APPENDIX D

DISTRIBUTION OF NONVERBAL BEHAVIOR ACROSS PLAY STYLES

Behavior	Solitary			Parallel			Social			Total
	Frequen- cy	%	*	Frequen- cy	%	*	Frequen- cy	%	*	
MTM	92	23.5	2	102	26.1	7	197	50.4	16	391
S	86	22.3	3	96	24.9	8	204	52.8	15	386
VM	78	32.8	1	78	32.8	6	82	34.5	19	238
MTB	7	5.6	12	11	8.8	14	107	85.6	5	125
VB	0	0	0	9	7.8	15	107	92.2	2	116
VP	1	1.5	12	8	11.8	12	59	86.8	4	68
MA	7	13.0	8	10	18.5	10	37	68.5	11	54
VAP	9	18.8	6	19	39.6	2	20	41.7	17	48
F	10	21.3	5	8	17.0	11	29	61.7	9	47
M	10	22.2	4	19	42.2	1	16	35.6	18	45
P	2	5.4	13	14	37.8	3	21	56.8	14	37
J	2	7.1	10	10	35.7	5	16	57.1	13	28
MTP	3	13.6	7	1	4.5	16	18	81.8	8	22
MT	1	5.6	12	2	11.1	13	15	83.3	6	18
VAM	2	11.1	9	0	0	0	16	88.9	3	18
VAB	1	5.9	11	2	11.8	12	14	82.4	7	17
MAP	0	0	0	6	37.5	4	10	62.5	12	16
SS	1	6.3	10	4	25.0	9	11	68.8	10	16
MAM	0	0	0	0	0	0	1	100	1	1
MAB	0	0	0	0	0	0	0	0	0	0
Totals	312			399			980			1691

* - rank ordering

APPENDIX E

ON-TASK BEHAVIORS

MT

Play Type	%	Raw Score
Solitary	5.6	1
Parallel	11.1	2
Social	83.3	15

VB

Play Type	%	Raw Score
Solitary	0	0
Parallel	7.8	9
Social	92.2	107

VM

Play Type	%	Raw Score
Solitary	32.8	78
Parallel	32.8	78
Social	34.5	82

MTM

Play Type	%	Raw Score
Solitary	23.5	92
Parallel	26.1	102
Social	50.4	197

MTP

Play Type	%	Raw Score
Solitary	13.6	3
Parallel	4.5	1
Social	81.8	18

VP

Play Type	%	Raw Score
Solitary	15.0	1
Parallel	11.8	8
Social	86.8	59

MTB

Play Type	%	Raw Score
Solitary	5.6	7
Parallel	8.8	11
Social	85.6	107

Frequencies

Motion total - 556

Vision total - 422

Raw Score total- 978

APPENDIX F

OFF-TASK BEHAVIORS

MA

Play Type	%	Raw Score
Solitary	13.0	7
Parallel	18.5	10
Social	68.5	37

VAB

Play Type	%	Raw Score
Solitary	5.9	1
Parallel	11.8	2
Social	82.4	14

VAM

Play Type	%	Raw Score
Solitary	11.1	2
Parallel	0.0	0
Social	88.9	16

MAM

Play Type	%	Raw Score
Solitary	0.0	0
Parallel	0.0	0
Social	100.0	1

MAP

Play Type	%	Raw Score
Solitary	0.0	0
Parallel	37.5	6
Social	62.5	10

VAP

Play Type	%	Raw Score
Solitary	18.8	9
Parallel	39.6	19
Social	41.7	20

MAB

Play Type	%	Raw Score
Solitary	0.0	0
Parallel	0.0	0
Social	0.0	0

Frequencies

Motion total - 71

Vision total - 83

Raw Score total -154

APPENDIX G

DURATION

MTP $\chi^2 = 14.85469$
 $p = 0.0050$

Play Type	1	2	3
Solitary	7.7 1	0.0 0	100.0 2
Parallel	7.7 1	0.0 0	0.0 0
Social	84.6 11	100.0 7	0.0 0

MTM $\chi^2 = 11.71058$
 $p = 0.0196$

Play Type	1	2	3
Solitary	25.5 65	14.1 13	31.8 14
Parallel	23.9 61	27.2 25	36.4 16
Social	50.6 129	58.7 54	31.8 14

P $\chi^2 = 12.63536$
 $p = 0.0132$

Play Type	1	2	3
Solitary	0.0 0	28.6 2	0.0 0
Parallel	44.0 11	0.0 0	60.0 3
Social	56.0 14	71.4 5	40.0 2

MA $\chi^2 = 11.71058$
 $p = 0.0196$

Play Type	1	2	3
Solitary	22.7 5	10.0 2	0.0 0
Parallel	31.8 7	5.0 1	16.7 2
Social	45.5 10	85.0 17	83.3 10

VM $\chi^2 = 50.92818$
 $p = 0.0000$

Play Type	1	2	3
Solitary	22.4 13	14.0 12	56.4 53
Parallel	31.0 18	34.9 30	31.9 30
Social	46.6 27	51.2 44	11.7 11

S $\chi^2 = 25.22292$
 $p = 0.0000$

Play Type	1	2	3
Solitary	28.3 28	26.6 41	12.8 17
Parallel	35.4 35	22.7 35	19.5 26
Social	36.4 36	50.6 78	67.7 90

APPENDIX H

TENSION

MT $\chi^2 = 11.82857$
 $p = 0.0187$

Play Type	1	2	3
Solitary	50.0 1	0.0 0	0.0 0
Parallel	0.0 0	7.1 1	50.0 1
Social	50.0 1	92.9 13	50.0 1

MTP $\chi^2 = 9.74561$
 $p = 0.0449$

Play Type	1	2	3
Solitary	100.0 1	5.3 1	50.0 1
Parallel	0.0 0	5.3 1	0.0 0
Social	0.0 0	89.5 17	50.0 1

MTM $\chi^2 = 27.69518$
 $p = 0.000$

Play Type	1	2	3
Solitary	0.0 0	0.0 0	50.0 1
Parallel	7.1 1	0.0 0	50.0 1
Social	92.9 13	100.0 1	0.0 0

S $\chi^2 = 10.277759$
 $p = 0.0360$

Play Type	1	2	3
Solitary	34.7 25	18.6 14	21.3 20
Parallel	27.8 20	29.5 65	11.7 11
Social	37.5 27	51.8 114	67.0 63

VAB $\chi^2 = 12.22959$
 $p = 0.0157$

Play Type	1	2	3
Solitary	0.0 0	0.0 0	50.0 1
Parallel	7.1 1	0.0 0	50.0 1
Social	92.9 13	100.0 1	0.0 0

S $\chi^2 = 21.91451$
 $p = 0.0002$

Play Type	1	2	3
Solitary	34.7 25	18.6 41	21.3 20
Parallel	27.8 20	29.5 65	11.7 11
Social	37.5 27	51.8 114	67.0 63

APPENDIX I

SPEED

MTM $\chi^2 = 22.74860$
 $p = 0.0001$

Play Type	1	2	3
Solitary	36.8 25	21.5 53	18.2 14
Parallel	33.8 23	27.6 68	14.3 11
Social	29.4 20	50.8 125	67.5 52

MTB $\chi^2 = 24.75478$
 $p = 0.0001$

Play Type	1	2	3
Solitary	17.6 3	4.7 3	2.3 1
Parallel	35.3 6	6.3 4	2.3 1
Social	47.1 8	89.1 57	95.3 41

MAP $\chi^2 = 6.17373$
 $p = 0.0456$

Play Type	1	2	3
Solitary	0.0 0	0.0 0	0.0 0
Parallel	100.0 2	18.2 2	66.7 2
Social	0.0 0	81.8 9	33.3 1

SS $\chi^2 = 17.61983$
 $p = 0.0015$

Play Type	1	2	3
Solitary	0.0 0	0.0 0	100.0 1
Parallel	18.2 2	50.0 2	0.0 0
Social	81.8 9	50.0 2	0.0 0

APPENDIX J

RANGE

MTM $\chi^2 = 28.66599$
 $p = 0.0000$

Play Type	1	2	3
Solitary	32.0 41	21.9 35	15.7 16
Parallel	33.6 43	26.9 43	14.7 15
Social	34.4 44	51.3 82	69.6 71

MTB $\chi^2 = 15.04353$
 $p = 0.0046$

Play Type	1	2	3
Solitary	10.0 2	3.9 2	5.6 3
Parallel	30.0 6	3.9 2	5.6 3
Social	60.0 12	92.2 47	38.9 48

MA $\chi^2 = 19.67232$
 $p = 0.0006$

Play Type	1	2	3
Solitary	46.2 6	0.0 0	5.0 1
Parallel	23.1 3	23.8 5	10.0 2
Social	30.8 4	76.2 16	85.0 17

SS $\chi^2 = 9.93939$
 $p = 0.0415$

Play Type	1	2	3
Solitary	33.3 1	0.0 0	0.0 0
Parallel	66.7 2	20.0 2	0.0 0
Social	0.0 0	80.3 8	100.0 3

APPENDIX K
CODING SHEET

Number of 30 second incidents	Identification # of Child	Distance number on Tape	Card Number	Play Style	Rater	M T D Sp R	MT T D Sp R	MTP T D Sp R

MTM T D Sp R	MTB T D Sp R	MA T D Sp R	MAP T D Sp R	MAM T D Sp R	MAB T D Sp R

P T D Sp R	V T D Sp R	VP T D Sp R	VM T D Sp R	VB T D Sp R	VAP T D Sp R

VAM T D Sp R	VAB T D Sp R	S T D Sp R	F T D Sp R	SS T D Sp R